United States Patent [19]

Greco et al.

[11] **4,261,120**

[45] **Apr. 14, 1981**

[54] **ELECTRIC PRESSING IRON HAVING INDICATING READY LIGHT WITH IMPROVED SWITCH MEANS**

[75] Inventors: **Robert W. Greco**, Waterbury; **Carl D. McArthur**, Winsted, both of Conn.

[73] Assignee: **Scovill Inc.**, Waterbury, Conn.

[21] Appl. No.: **917,172**

[22] Filed: **Jun. 20, 1978**

[51] **Int. Cl.**[3] **D06F 75/26**; H05B 1/02

[52] **U.S. Cl.** **38/82**; 219/248; 219/506

[58] **Field of Search** 38/82, 77.7, 77.83; 219/246, 248, 506, 515

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,527,775	10/1950	Sutton	219/506 X
2,593,812	4/1952	Turner	219/248
2,778,913	1/1957	Finlayson	219/506
2,786,990	3/1957	Garner	219/506 X
3,035,144	5/1962	Kircher	219/506 X
4,029,940	6/1977	Eaton et al.	219/248 X

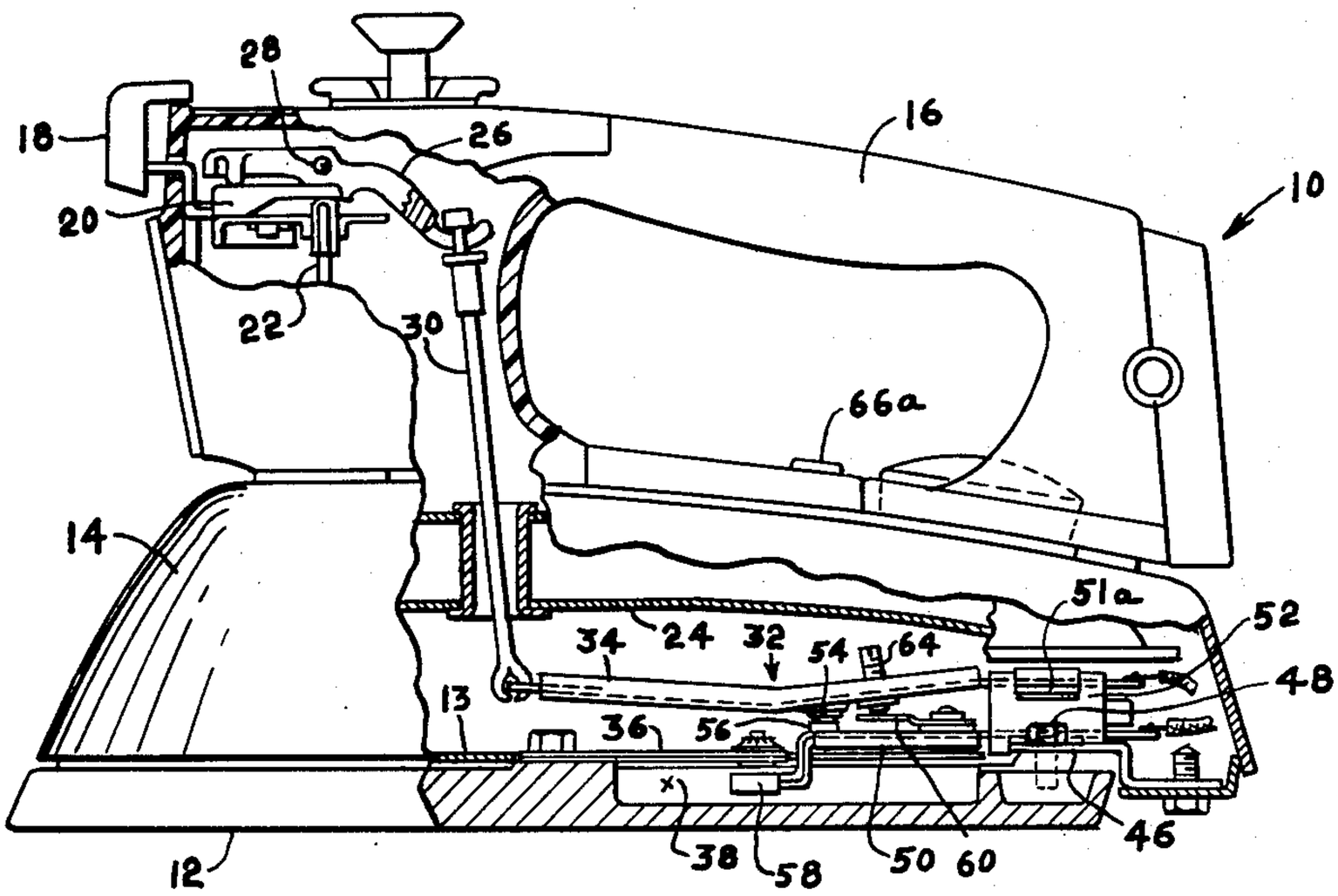
Primary Examiner—Louis Rimrodt

Attorney, Agent, or Firm—Dallett Hoopes

[57] **ABSTRACT**

Ready light circuit is provided which comprises a simple third switch blade added to the standard thermostat two-blade switch in an electric iron. The invention involves the improvement of mounting the third blade on one of the other blades of the two-blade switch.

2 Claims, 14 Drawing Figures



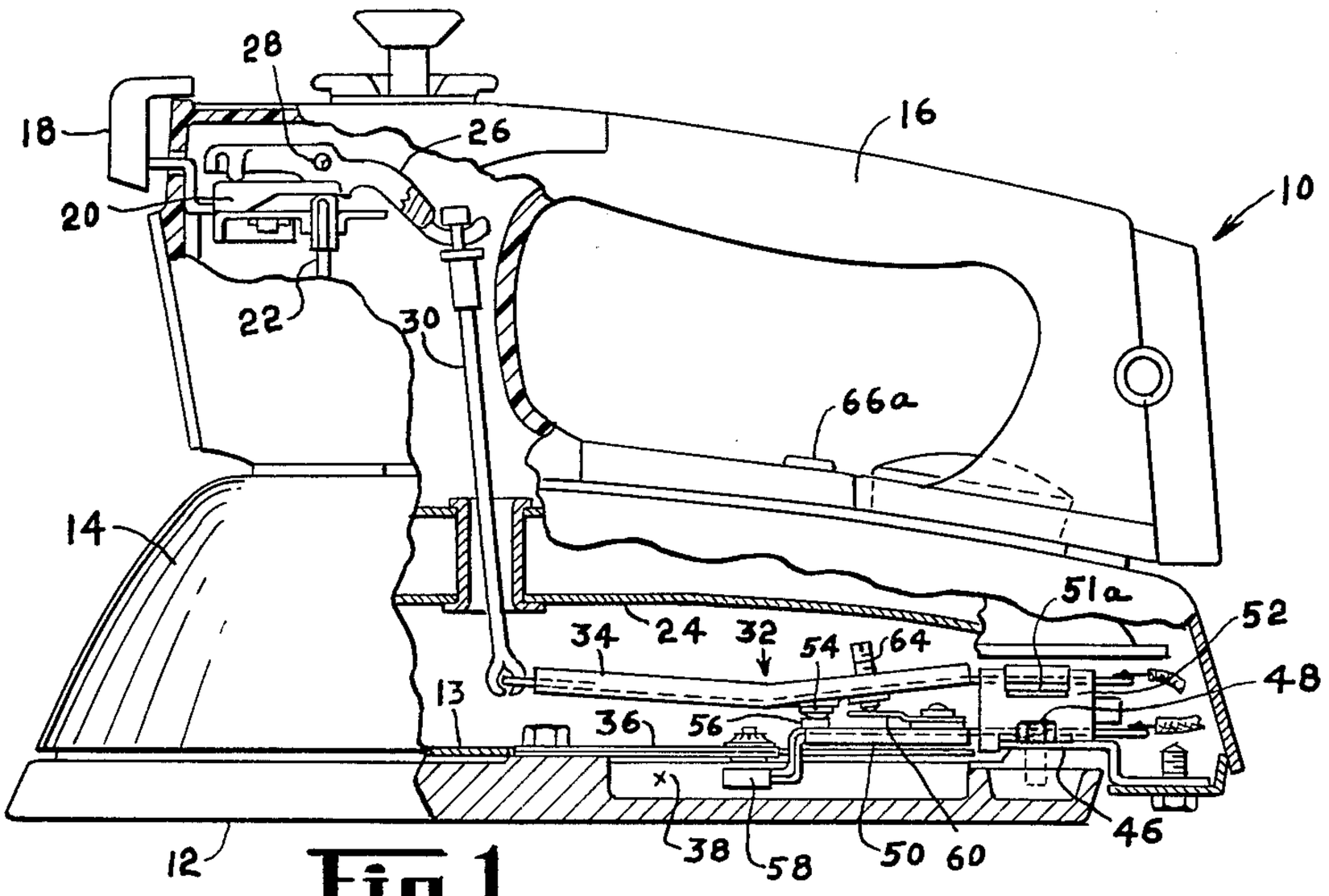


Fig. 1.

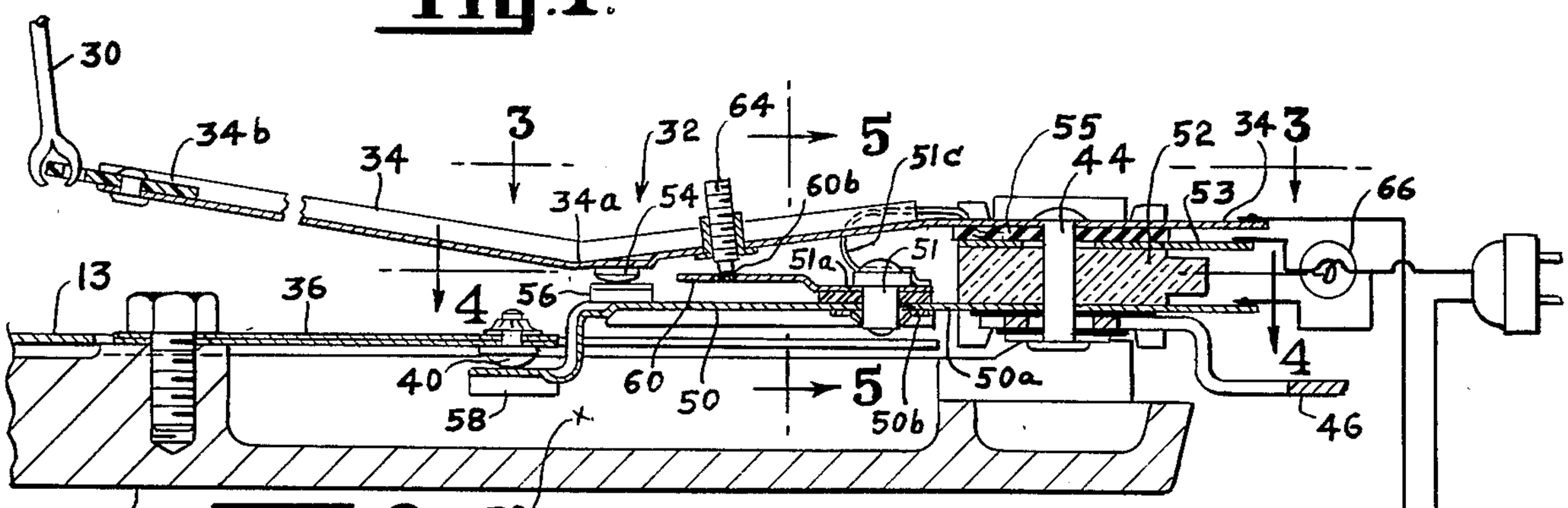


Fig. 2.

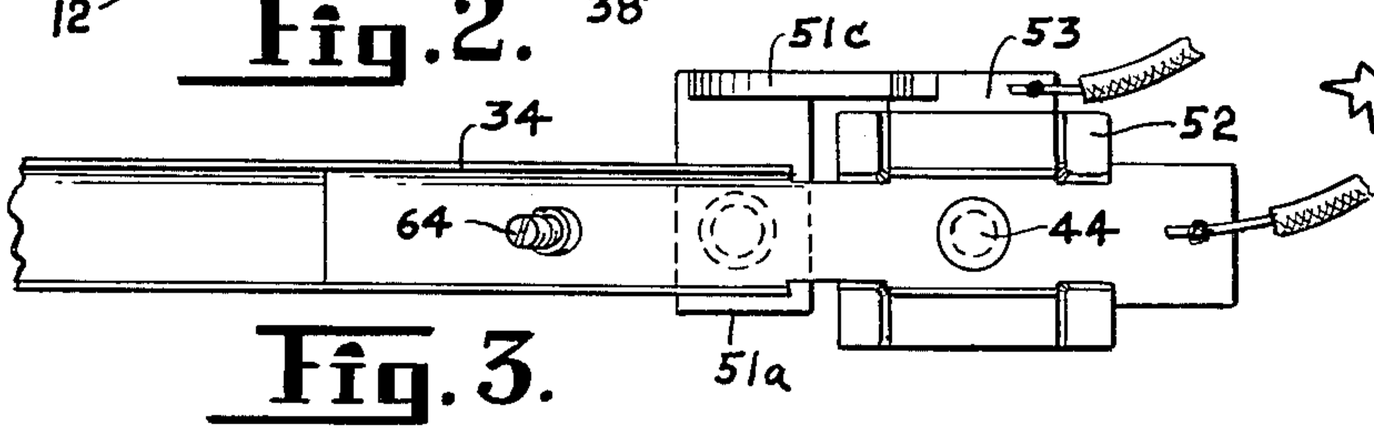


Fig. 3.

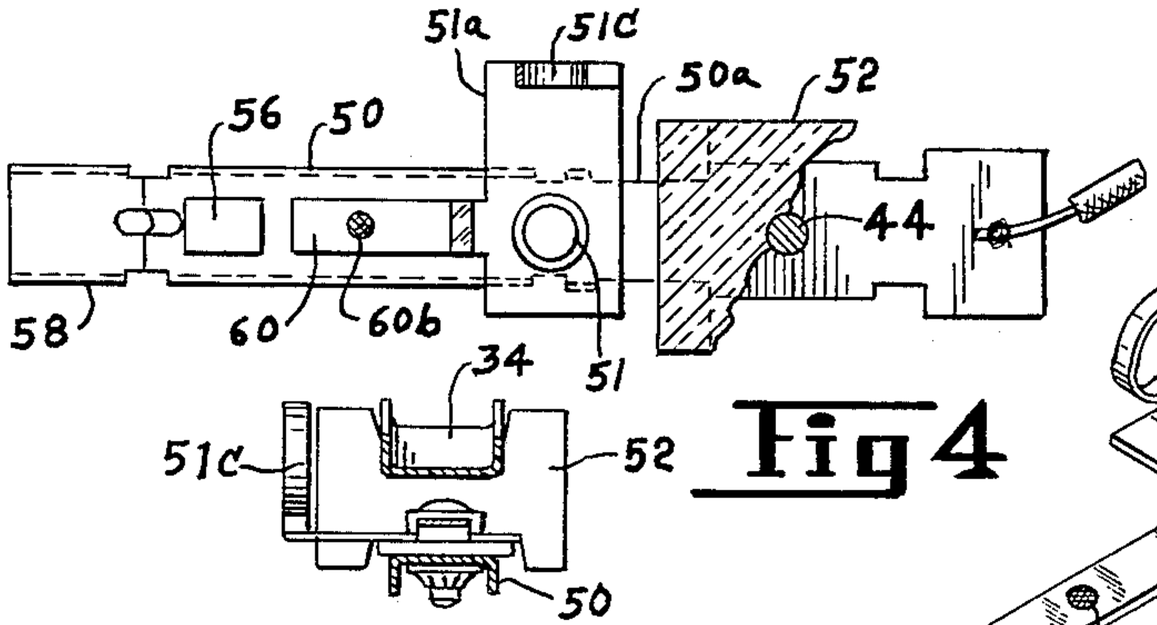


Fig. 4

Fig. 5.

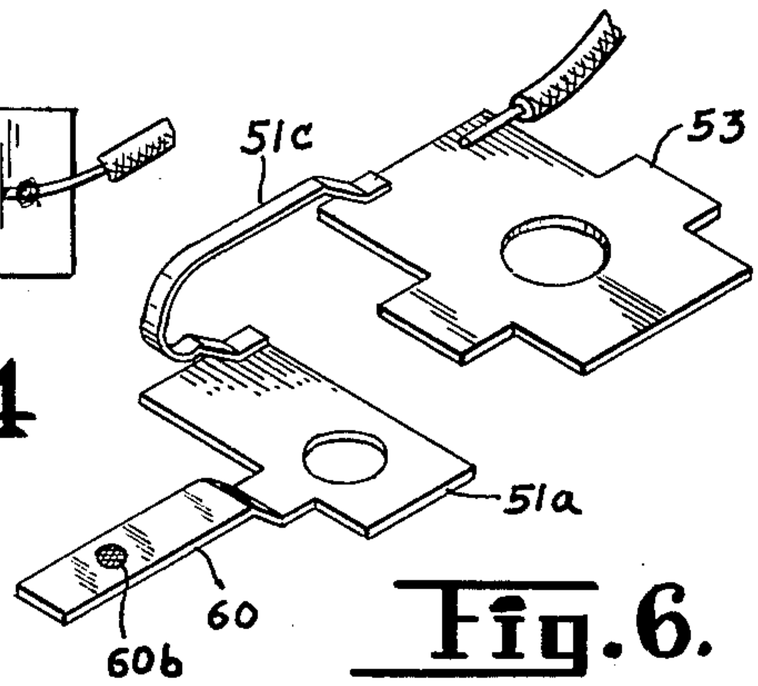


Fig. 6.

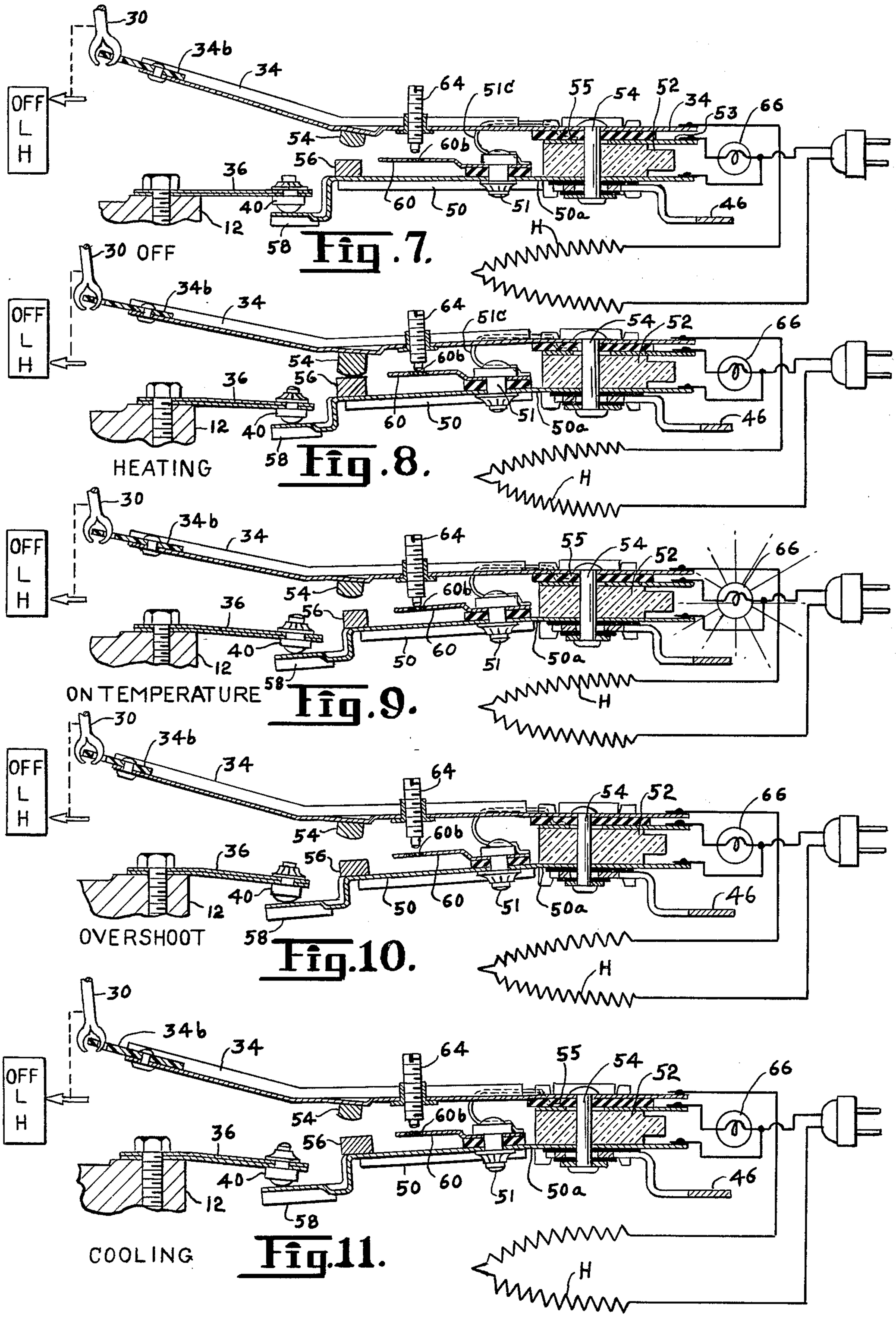


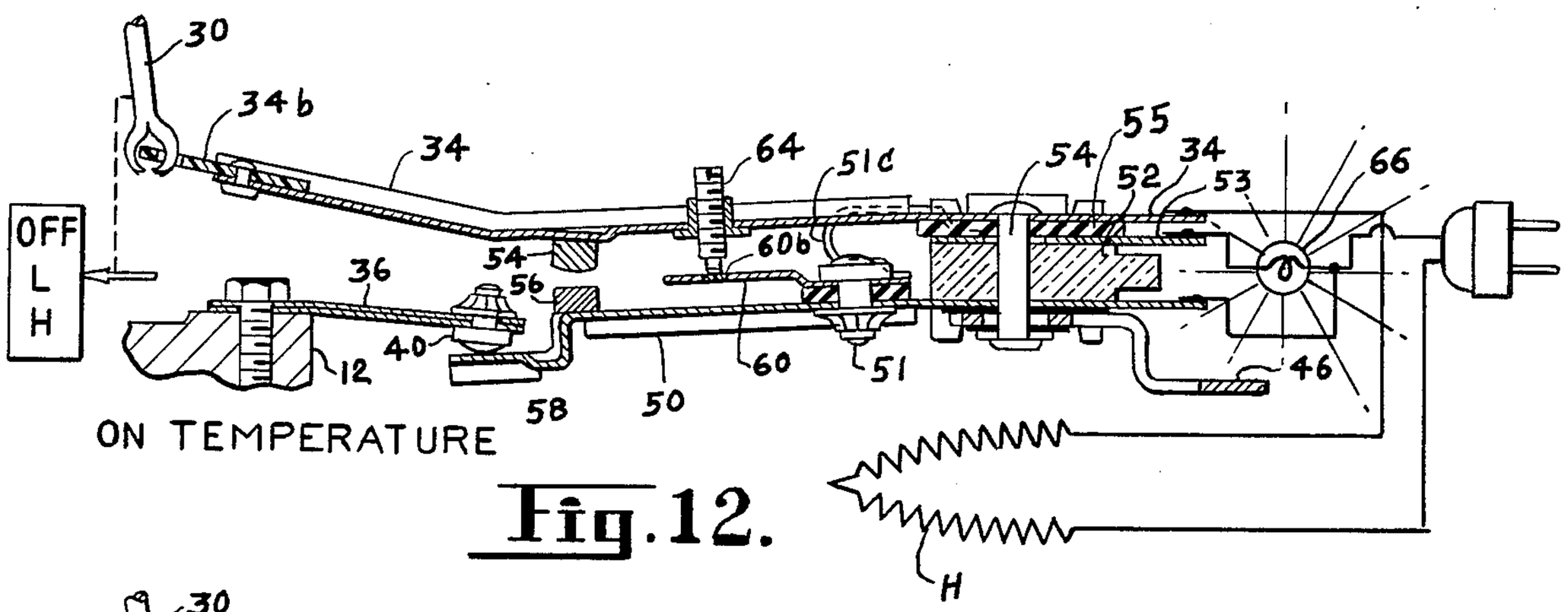
Fig. 7.

Fig. 8.

Fig. 9.

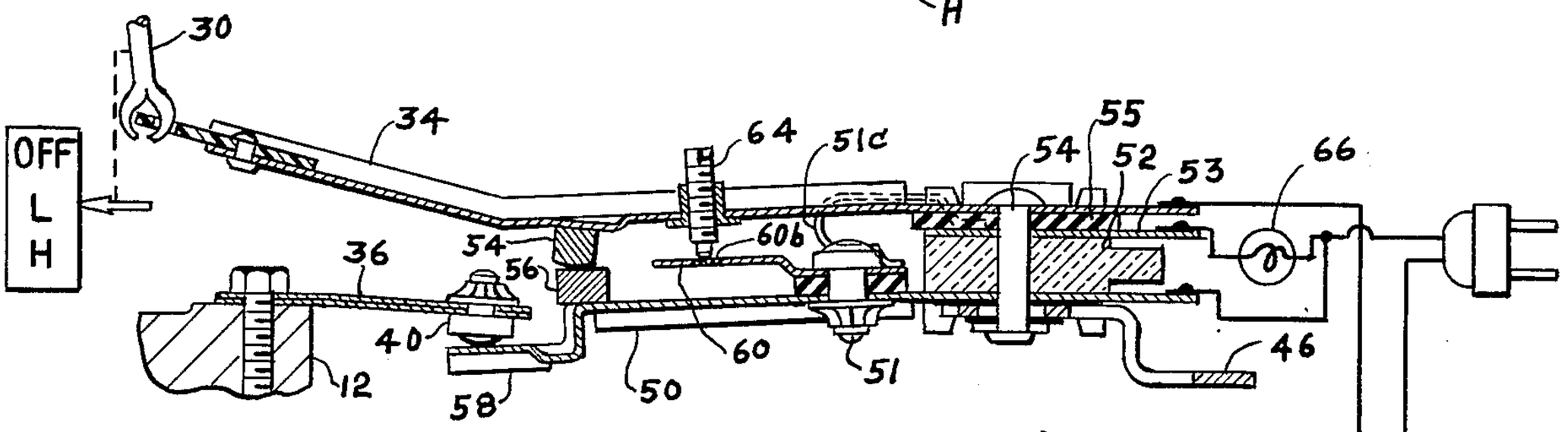
Fig. 10.

Fig. 11.



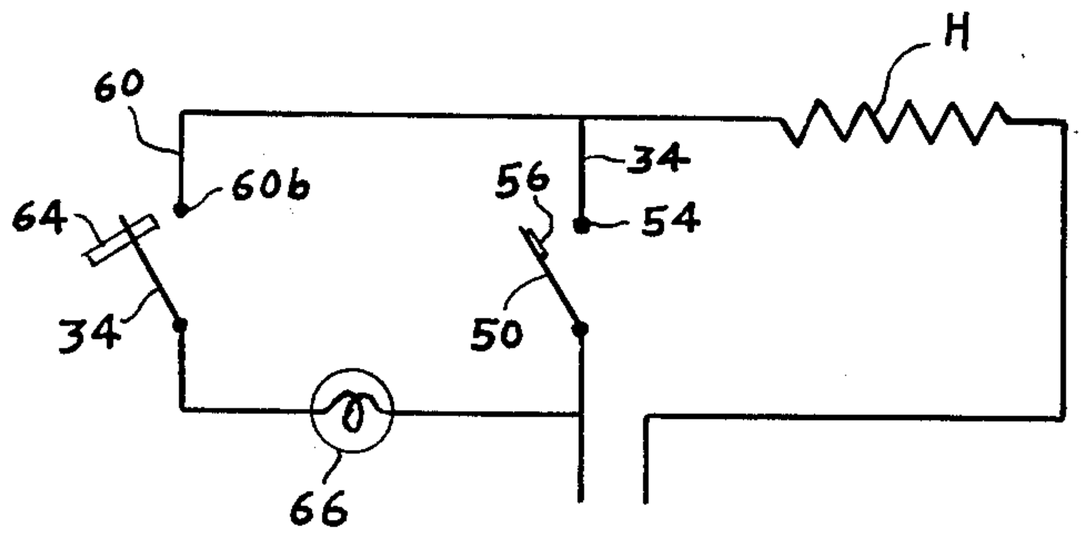
ON TEMPERATURE

Fig.12.



CALLING FOR HEAT

Fig.13.



POWER

Fig.14.

ELECTRIC PRESSING IRON HAVING INDICATING READY LIGHT WITH IMPROVED SWITCH MEANS

CROSS REFERENCES TO RELATED APPLICATION

This application relates to an invention which is an improvement on the invention disclosed in U.S. patent application Ser. No. 810,502, filed June 27, 1977, now abandoned by George Wallace Robinson and assigned to our assignee.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an electric pressing iron having a ready light for indicating when the soleplate of the iron is in the temperature range for which the temperature control has been set. More specifically, the invention relates to an electric pressing iron having an indicator light circuit including extremely simple switch means which accurately reflect the condition of the iron, are capable of simple factory adjustment, and are foolproof in operation.

2. Description of the Prior Art

The prior art includes U.S. patent application Ser. No. 810,502, filed June 27, 1977, upon which the present invention is an improvement. That application disclosed an electric pressing iron having a ready light which would go on to indicate that the temperature of the iron was in the desired temperature range. The ready light would not go on while the soleplate was being heated because during that time the soleplate might well be below the operating temperature selected. Also, the ready light would not go on if the soleplate was of too hot a temperature as when the shift is made between a linen/wool setting down to a cooler new setting for synthetics. The earlier above-identified application was indeed meritorious and has been put into practice.

SUMMARY OF THE INVENTION

In the prior device described above, aberrations in the contact arrangement in the ready light circuit have been required. Under the present arrangement, it has been discovered that such aberrations can be avoided if the third blade, part of the ready light circuit, is mounted directly on one of the other two contact blades so that it moves with that contact blade.

BRIEF DESCRIPTION OF THE DRAWING

Other objects and features of the invention will be apparent from a reading of the following specification and reference to the attached drawings, all of which comprise a disclosure of a non-limiting embodiment of the invention. In the drawings:

FIG. **1** is an elevational view of a pressing iron embodying the invention, the iron being broken away in parts to reveal operative parts thereof;

FIG. **2** is an enlarged sectional view of the switch and including a schematic diagram of the iron heating an indicating light circuit;

FIG. **3** is a plan view of a portion of the switch taken on the line **3—3** of FIG. **2**;

FIG. **4** is a fragmentary sectional view taken on the line **4—4** of FIG. **2**;

FIG. **5** is a fragmentary sectional view taken on the line **5—5** of FIG. **2**;

FIG. **6** is a perspective view of the terminal plate third blade assembly;

FIGS. **7** through **13** are views comparable to portions of FIG. **2** showing the position of the various elements under conditions as described in the specification hereinbelow; and

FIG. **14** is a circuit diagram.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more specifically to the drawings, an iron embodying the invention is generally designated **10** in FIG. **1**. Outwardly it comprises a cast soleplate **12** with cover **13** (FIG. **2**) superposed by a conventional sheetmetal skirt **14** over which is mounted a handle **16**, a front portion of which is hollow, as shown, to accommodate various working parts. A light window **66***a* is formed in the housing under the handle.

A temperature setting lever **18** is disposed external of the handle and is pivoted to structure inside the handle and adapted to rotate a cam **20**. As is conventional, the cam operates a steam control valve **22** permitting water to be dispensed from a tank **24** onto the inside of the soleplate **12** which is perforated (not shown) for the purpose of venting steam.

Also operated by the cam **20** in a well-known manner is are **26** pivoted at **28** and attached at its rearward end to a temperature element setting link **30**.

Mounted on the top of the soleplate **12** towards the rear of the iron is a switch assembly **32** which includes a forwardly cantilevered sheetmetal upper blade **34**, the distal end of which is engaged by the link **30**. Thus, by manipulating the lever **18**, the height of the distal end of the blade **34** may be raised or lowered and set at a desired level to effect a desired temperature setting of the iron. Blade **34** cooperates with other structure in the switch assembly **32** to effect the activation and deactivation of the iron heater to achieve the desired temperature.

Included in the conventional iron temperature control switch assembly is the bimetallic element **36** mounted at one end to the soleplate and cantilevered out over a recess **38** in the soleplate in the opposite direction from the switch blade **34**. The distal end of the bimetallic element is formed with an opening penetrated by a headed element **40**, the head being disposed on the underside of the element **36**.

Still more specifically, the switch assembly **32** is rivetted as at **44** to a plate **46** which, as shown, is bolted at **48** (FIG. **1**) to the soleplate. The assembly includes a sheetmetal lower blade **50** insulated from the rivet **44** and plate **46**, and an insulation block **52**, preferably ceramic.

The upper blade **34** and the lower blade **50** carry contact buttons **54** and **56**, respectively. The lower blade **50** is biased upward by its natural resilience and carries a downwardly offset dog-leg portion **58**. The upper surface of the offset portion **58** continuously engages the head of the element **40**. As shown (FIG. **5**), the blades **34** and **50** may be channel-shaped to stiffen them, the upward bias of the blade being achieved at a section **50***a* thereof immediately adjacent the block **52**. The outer end of the blade **34** may be deflected at an elbow **34***a* as shown and terminate in an insulated section **34***b* which is apertured and receives the end of the link **30**.

The operation of the structure as shown before is conventional depending upon the setting of lever **18** and

in turn the height of the end **34***b* of blade **34**, and depending on the disposition of the bimetallic element **36**, that is, whether it holds the offset portion **58** down or not, the buttons **54**, **56** contact or not to activate or deactivate the circuit including the heading element H.

Attention is now focused on the light circuit and components. The insulating block **52** (FIG. **3**) electrically insulates and mounts the inner ends of blades **50** and **34**. The terminal plate **53** rests on the block **52** and is superposed by an insulating layer **55** which is in turn superposed by the inner end of blade **34**. Note that the plate **53** is apertured generously about the clamping rivet **44** so as to not contact it. The circuit is as shown schematically.

As shown in FIG. **2**, blade **50** is apertured at **50***b* and receives a rivet **51** which secures to blade **50** the metal strip **51***a* with its outwardly extending blade **60** having the offset **51***b* (FIG. **6**). Insulation means surround the rivet **51**, as shown, to isolate the base **51***a* electrically from the blade **50**. A flexible lead **51***c* connects the base **51***a* and the plate **53**. As shown, the blade **60** extends more or less parallel to the blade **50** and moves up and down as the blade **50** which carries it flexes at **50***a*.

Blade **60** carries a contact area **60***b* which engages the adjustable contact screw **64** (FIG. **2**) as will be described.

It will be noted from the circuit diagram of FIG. **14** that the switch blades **34** and **50** (contacts **54**,**56**) are in series with the heater H across the power line. The light **66** is in series with the blades **60** and **34** (contacts **64**, **60***b*) and across the blades **34** and **50** (contacts **54**, **56**). As a result, the light **66**, which in the iron is disposed visibly behind the window **66***a* (FIG. **1**), only lights when the contacts **64**, **60***b* are closed and the heater switch **34**, **50** (contacts **54**, **56**) is open, for when the latter is closed it shorts across the light and blades **34** and **60** (contacts **64**, **60***b*). This arrangement equates to the light lighting when the iron reaches the set temperature and remaining on until the temperature drops sufficiently to cause the blades **34**, **50** to close at **54**, **56** activating the heater. Thus, in other words, the light is on when the soleplate is at the desired "ready" temperature.

The operation of the structure so far described will be apparent from reference to FIGS. **7** through **12**. In the first place, it must be understood that the bimetallic element **36** reflects the temperature it sees and the distal end thereof is at a higher level the cooler the temperature, and at a lower level the hotter the temperature it sees.

From the drawings **7** through **13**, it will be apparent that the setting of the distal end of the blade **34** which is accomplished by lever **18** through linkage **30**, is highest for the "off" position and then progresses downwardly the higher the temperature for which the iron is set. For convenience, it is indicated diagramtically in FIGS. **7** through **13** by the indications "Off", "L" for low or cooler setting, "H" for high or hot setting. With the above in mind, it will be noted that at the "off" setting, the blade **34** is high and the contact buttons **54** and **56** do not engage, the heater H not being energized. Similarly, the third blade **60**, moving with blade **50**, does not engage the contact **64**. The lamp **66** is off.

In FIG. **8**, the setting has been moved to "high" which lowers the distal end of the blade **34** to the point where the buttons **54** and **56** contact, activating the heater H. While contact **64** and point **60***b* engage, the light does not light because the buttons **54**, **56** in contact close the heater to short out the light.

As time passes and the iron heats (FIG. **9**), the distal end of the bimetallic element **36** drops, driving down the blade **50** and thereby separating the contacts **54**, **56**. This lowering causes the blade **60** mounted on element **50** also to lower, but because of the natural bias of the blade **60** at its bend adjacent its mounting, the contact point **60***b* still engages the contact **64**. Thus, with the heater H off and contacts **64**, **60***b* closed, the light **66** is activated indicating that the iron has arrived at the set temperature.

It will be understood that were the iron to initially be set from the "off" position to an "L" position, the operation would be substantially the same except that because arm **34** and button **54** would be at a slightly higher level than that shown in FIG. **7**, the bimetallic element **36** would not need to lower as much for deactivation of heater H as for an "H" setting.

FIG. **10** depicts the "overshoot" condition in which the temperature of the soleplate continues for a short time to rise after the heater is cut off. The continued rise is due to the inertia or heat momentum of the mass of the heater and the soleplate before the ambient temperature prevails to start to cool the mass again. This phenomenon is comparable to the continued rise of a rocket for a moment after its engines have been shut off. In the overshoot condition, the bimetallic element permits the continued lowering of the blade **60** to the shown condition (FIG. **10**) in which contact **64** and point **60***b* disengage, deactivating the light **66** to warn the user not to use the iron because its soleplate is above the preset temperature.

FIG. **11** depicts the condition of the parts after the temperature of the iron has been at high and the temperature setting has been changed from "high" to "low". This would be the case, for instance, if the user were to switch from ironing wools or linens to ironing synthetics. Because the bimetallic element **36** is low (FIG. **11**), the blade **50** is held down and the blade **60** is permitted to drop with the result that the heater is off, as is the lamp **66**. The contacts **54**, **56** do not engage and the contact **64** and contact **60***b* do not engage. To the user, the absence of the light means that the iron is not ready for operating at a temperature suitable for synthetics.

When the iron has cooled sufficiently (FIG. **12**) , the bimetallic element **36** rises permitting the blade **50** to rise and raising the blade **60**. Before the contacts **54** and **56** close, the contact **64** will engage the contact point **60***b* activating the light **66** and indicating that the iron is ready to use at the new low temperature.

Subsequently (FIG. **13**), as the temperature drops further, the bimetallic element **36** will rise further permitting the blade **50** to raise so that contacts **54** and **56** engage, activating the heater H and shorting out the light **66**. The flexure of the blade **60** absorbs the further upward movement of the bimetallic element **36**.

Subsequently (not shown), the iron will pick up heat with the activation of the heater H, driving the bimetallic element **36** downward to in turn lower blade **50** and disengage contacts **54**, **56**, deactivating the heater H and reactivating the lamp **66** as the contact **64** and point **60***b* stay engaged. This cycling is continued as long as the iron is maintained at the low setting.

It will thus be apparent that from a very minor modification of a conventional two-blade thermostat switch an iron may be provided with an effective ready light for indicating when the iron is at the desired tempera-

ture. It will be apparent that at the factory the setting of the light switch is accomplished by adjustment of the set-screw-type contact **64**.

Variations of the arrangement described are possible, all within the scope of the invention which may be defined by the following claim language:

We claim:

1. In an electric pressing iron having a heater circuit, the iron having mounted on the top of its soleplate a temperature-sensitive switch comprising a pair of superposed, spaced aligned contact blades cantilever-mounted and extending in the same direction, the switch including an upper blade and a lower blade, the blades carrying aligned contact zones, a bimetallic element cantilever-mounted on the soleplate in heat exchange relation therewith an adapted to engage with its distal end the lower blade to move the distal end of said lower blade away from the upper blade in conditions of no-heat-demand to separate the contact zones, temperature control setting means on the iron including means to raise and lower the distal end of the upper blade, the heater circuit being operatively connected in series with the switch, and a ready light circuit including a third blade mounted cantilever-fashion and disposed between and generally aligned with the other blades, the upper blade and third blade having aligned contact points, the bimetallic element adapted in conditions approaching heat-demand to cause upward movement of the distal end of the third blade to adjacent the upper blade to close the contact points, the ready light and the contact points being operatively connected in series and across the contact zones of the upper and lower blades, the improvement whrerein the third blade is mounted on the upper side of the lower blade and the bimetallic element causes upward movement of the distal end of the third blade by permitting the lower blade to raise.

2. An electric pressing iron as claimed in claim **1** wherein the contact point on the upper blade is in the form of an adjustable contact screw.

* * * * *